10.0 Radioactive Materials and Non-ionizing Radiation

Human exposure to ionizing radiation results from naturally occurring radioactive materials, from radionuclides introduced into the environment by man (nuclear power, weapons testing, etc.), and from cosmic radiation. The route of exposure may be either external, as in the case of cosmic radiation, or internal via inhalation or ingestion of radionuclides. Specific levels of exposure are a function of many variables, including location, altitude, nuclide concentration in the soil, food consumption, and recreational habits. Annual wholebody radiation of SSC is estimated to be about 330 millirem, based on the location of SSC and measurements typical of the southern United States (4). Regulations under the Occupational Safety and Health Act (OSHA) define radiation areas and high radiation areas for the work place (29 C.F.R. § 1910.96). Since Mississippi is an agreement state, SSC is deemed in compliance as long as it meets the Mississippi Board of Health regulations, part 801-radiation. Radiation areas are based on a major portion of the body being exposed to a radiation dose in excess of five millirem per hour or in excess of 100 millirem per five consecutive days. High radiation areas are accessible areas where a major portion of the body could receive a radiation dose in excess of 100 millirem per hour. The above doses are not averaged; they refer to exposure in any one-hour or block of days.

For non-ionizing radiation, OSHA established (29 C.F.R. § 1910.97) a radiation protection guide for normal environmental conditions and for incident electromagnetic energy of frequencies from 10 MHz to 100 MHz. This radiation protection guide is 10 milliwatts per square centimeter, as averaged over any possible one-hour period.

10.1 Ionizing Radiation Sources

An inventory of all ionizing radiation sources and audits are located in the FOSC Environmental and Safety Services Office at SSC. The NASA Radiation Safety Coordinator (RSC), RSO's for each of the tenants, and contractors with radiation sources on-site, monitor these sources and maintain compliance with State permitting requirements. Mississippi Space Services and Lockheed Martin Space Operations hold Mississippi licenses, for Non-Destructive Evaluation (NDE) activity as well as chemical and laboratory equipment that is currently being operated at SSC.

10.2 Non-ionizing Radiation Sources

The nonionizing radiation sources at SSC are microwave ovens and antennas, located throughout the facility. A nonionizing radiation baseline survey was conducted during the last quarter of 1999.

10.3 Major Environmental Considerations for Proposed Actions

The following are considerations for new ionizing and nonionizing radiation sources that may be required for proposed projects.

- Will any new action result in the need for any new source of ionizing radiation to be used on-site?

- Will any new action result in the need for any new source of nonionizing radiation to be used on-site?

Positive response to either of these two questions requires immediate contact NASA Environmental Management to ensure that no action jeopardizes compliance with NEPA, NRC, or State regulations. All construction and testing operations must be coordinated through NASA Environmental Management so that environmental impacts can be properly assessed.

10.4 References

1. Gordon, J.B., 1995, August, Interviewed by C. Hall.

2. Ebasco, 1989, Final Environmental Impact Statement, Space Shuttle Advanced Solid Rocket Motor Program.

3. NASA, 1989, Environmental Assessment of the Component and Subsystem Development Test Facility, Stennis Space Center.

4. NASA, 1992, Environmental Resource Document, Inventory Summaries, Stennis Space Center.

5. NASA, 1999, Radiation Source Inventory Report, Stennis Space Center.

6. U. S. Air Force, 1999, 738 EIS Engineering Report, Electromagnetic Environmental Survey, Stennis Space Center, MS.